

Examining the Effects of a National Alcohol-Free Fraternity Housing Policy

Scott B. Crosse,^{1,4} Elizabeth M. Ginexi,² and Barry D. Caudill³

Published online: 12 August 2006

This investigation examined the effectiveness of an alcohol-free fraternity housing policy on the risky alcohol use of members of a national fraternity (N = 718). Comparisons of members in chapters with fraternity housing (FH) and those in chapters without housing (NFH) over time revealed no policy-related effects on measures of alcohol use. Among FH members, comparisons of those who lived in fraternity housing and those who lived in other housing also found no effects. FH members reported that the policy was implemented moderately well; however, it may have shifted alcohol use from fraternity housing to other settings.

Editors' Strategic Implications: The results of this study will be of interest to national and local fraternity administrators, campus student affairs and dean of students offices, and substance use counselors in various settings. For fraternity and possibly other college student populations, an alcohol-free housing policy appears to be a strategy that does not work.

KEY WORDS: alcohol-free; policy; fraternity; university; multi-level.

Over the past decade, the issue of high risk drinking has received national attention as one of the leading public health problems affecting college students (Kapner, 2003; National Institute on Alcohol Abuse and Alcoholism [NIAAA], 2002). With national surveys between 1993 and 2001 noting that well over a third of college students report "drinking heavily" in the past 2 weeks (O'Malley & Johnston, 2002; Presley, Meilman, & Cashin, 1996; Wechsler et al., 2002), high risk college drinking remains widespread. Moreover, high levels of alcohol

¹Associate Director, Substance Abuse Research Group, Westat, Rockville, Maryland.

²National Institute on Drug Abuse, Prevention Research Branch, Division of Epidemiology, Services and Prevention Research.

³Director, Center for Studies on Alcohol, Westat, Rockville, Maryland.

⁴Address correspondence to Scott B. Crosse, Ph.D., Westat, 1650 Research Boulevard, Rockville, Maryland 20850; e-mail: scottcrosse@westat.com.

consumption among college students has been associated with such negative consequences as aggression, driving while intoxicated, alcohol-related injuries, unwanted sexual activity, and long-term health risks (Hingson, Hereen, Zakocs, Kopstein, & Wechsler, 2002).

While excessive alcohol consumption is certainly a problem among college students generally, certain subgroups are at particularly high risk, including male students, white students (O'Malley & Johnston, 2002; Wechsler, Lee, Kuo, & Lee, 2000), and student athletes (Meilman, Leichliter, & Presley, 1999). Longstanding lore and recent empirical evidence also point to Greek organization membership, specifically fraternity membership, as a risk factor for high levels of alcohol consumption and adverse symptoms and consequences from such heavy drinking practices (Cashin, Presley, & Meilman, 1998; Larimer, Anderson, Baer, & Marlatt, 2000; Marlatt, Baer, & Larimer, 1995; Meilman et al., 1999; Sher, Bartholow, & Nanda, 2001; Wechsler, Kuh, & Davenport, 1996; Wechsler et al., 2000). Many students who drink heavily prior to entering college may join fraternities, in part, because fraternities are associated with alcohol use (Larimer et al., 2000). In addition, the fraternity environment may contribute to high levels of alcohol consumption because it typically: (a) offers easy access to large quantities of alcohol, (b) uses alcohol to foster socialization, and (c) supports the continuation of high levels of pre-college drinking (Borsari & Carey, 1999).

Regardless of the factors responsible, because fraternity members are at high risk for excessive alcohol use and adverse consequences from risky drinking practices, prevention efforts should focus on these students. National fraternities and colleges have attempted to curb heavy drinking among fraternity members by implementing diverse individually-focused approaches (e.g., educational/awareness programs and cognitive-behavioral interventions) and environmental approaches (e.g., restrictions on the availability of alcohol on campus) that address campus- and community-level influences on student alcohol use. By far, individually-focused approaches have received more attention from researchers than environmental approaches (Dowdall & Wechsler, 2002). A recent review of the efficacy of such individually-focused interventions (Larimer & Cronce, 2002) suggests that many of these efforts have demonstrated short-term effects on reducing risky levels of student drinking. However, because the environmental approaches also show great promise and they are being implemented widely (Wechsler, Seibring, Liu, & Ahl, 2004), they deserve increased study. Indeed, the recent NIAAA task force on college student drinking advocates that universities implement and evaluate combinations of individually-focused and environmental approaches to combat this multi-faceted and ingrained problem (NIAAA, 2002).

One environmental approach that is receiving an increasing amount of attention is the practice of restricting or banning alcohol use in fraternity housing. As of the 2001 to 2002 school year, the Fraternity Executives Association (FEA) (2002) reported that 6 of 32 national fraternities had implemented policies to restrict or ban alcohol use in their housing, with 5 of them doing so in 2000 or later; another 6

national fraternities were requiring alcohol-free fraternity housing for newly chartered chapters. (The 26 national sororities that compose the National Panhellenic Conference [NPC] have traditionally had alcohol-free housing policies; in 1998, the NPC adopted a resolution that set as a goal having NPC member organizations co-sponsor only alcohol-free functions in men's fraternity facilities by the fall term of 2000 (NPC, 2004a, 2004b).) The national fraternities have differed somewhat on aspects of their alcohol-free fraternity housing policies, with at least one, for example, permitting members of legal age to consume alcohol in fraternity facilities (FEA, 2002). The motivations for adopting alcohol-free housing policies also may vary by national fraternity, but they are likely to include the desire to: (a) reduce injury and health problems among student members, (b) reduce liability for alcohol-related injury and damage, (c) reduce damage to fraternity housing and other property, (d) improve relations with their host universities, and (e) improve the image of the fraternity locally and nationally.

Despite the potential for alcohol-free fraternity housing to reduce alcohol use among fraternity members, its effectiveness is unclear. Based on two waves of cross-sectional data collected at one large university, Kilmer, Larimer, Parks, and Marlatt (1999) concluded that the number of drinks per occasion among fraternity and sorority members actually increased 1 year after a policy was implemented to restrict alcohol use. Hence, the policy yielded some negative unintended consequences. In a cross-sectional study that drew on data from students (including fraternity members and non-members) at 95 colleges, Wechsler, Lee, Gledhill-Hoyt, and Nelson (2001) found lower levels of episodic heavy drinking and higher levels of abstention from alcohol use at colleges that banned alcohol compared to those that permitted alcohol. Wechsler et al. (2001), however, were unable to rule out the influence of potentially confounding factors, especially student self-selection to attend colleges that either banned or permitted alcohol.

Accordingly, the main purpose of the current study was to examine the effectiveness of implementing an alcohol-free fraternity housing policy in a national fraternity. In 2000, the fraternity in question implemented such a policy at its 99 chapters. While several chapters had previously adopted alcohol-free housing measures, this policy required a blanket ban on alcohol in all fraternity housing. (Subsequent to the implementation of the policy, the national fraternity granted waivers to the policy for some chapters.) We addressed two research questions in the study. First, did implementation of an alcohol-free fraternity housing policy reduce alcohol use among members in chapters with fraternity housing (that were not granted waivers)? Second, among chapters with fraternity housing, did implementation of an alcohol-free fraternity housing policy reduce alcohol use among members who lived in that housing?

The current investigation offers a number of distinct advantages over the studies conducted previously on alcohol-free housing policies. The advantages include our ability to examine the effectiveness of one such policy: (a) with a prospective design; (b) in a national fraternity rather than among several local

samples or sites; (c) based on high response rates at the chapter- and individual-level; (d) with data collection and measurement approaches that can enhance the accuracy of self-reported behaviors; and (e) using diverse measures of alcohol use. The current study also benefits from a design that includes two sets of analyses with two different comparison groups. One of the sets allowed for an examination of whether an alcohol-free housing policy is more likely to influence the alcohol use of students residing in fraternity housing than that of other members of the same fraternity chapters; this examination is important because implementing such a policy would be expected to more directly affect students who actually live in fraternity housing.

METHOD

We conducted two studies to answer the research questions. Study 1 was a large longitudinal study that provided the main findings; Study 2 was a small cross-sectional study that explored interpretations of the main findings and suggested directions for future research.

Study 1

Data for Study 1 were collected for an NIAAA-funded study of risk reduction trainings. The parent study was designed to examine the relative effectiveness of “server training” (i.e., skills training on intervening with others to prevent intoxication and alcohol-related risk behavior) and individually-focused approaches to reducing excessive alcohol use among student members of a national fraternity. To achieve that goal, 99 chapters of a national fraternity were stratified and randomly assigned to two treatment conditions (a standard intervention or an enhanced one) or to a control, or standard practices, condition. Chapters were stratified based on whether they: (a) had fraternity housing, (b) had alcohol-free housing, and (c) were sanctioned for problem behavior in the past 12 months. Four rounds of longitudinal data were collected (at baseline and at 6, 12, and 18 months following baseline), beginning in October 2000. At baseline, 98 fraternity chapters (of the 99 chapters eligible) participated, and 3,406 members (of the 3,967 members eligible) of those chapters were interviewed. Because the national fraternity implemented its alcohol-free housing policy soon after the baseline data collection had been completed for the parent study (in December 2000), we also were able to examine the effectiveness of that policy longitudinally.

Participants

All members of the 98 chapters participating in the parent study were eligible for inclusion in the baseline data collection, regardless of their year in school, as long as they were enrolled in courses at their home campus at that time and were

at least 18 years of age (to meet Institutional Review Board requirements). For the current investigation of alcohol-free housing, we included only chapters that (a) participated in at least two rounds of data collection (baseline plus at least one follow-up round); (b) were in the standard practices condition for the parent study on risk reduction trainings; (c) had not implemented alcohol-free housing prior to the baseline data collection; and (d) were not exempted from the alcohol-free housing policy at any time after it was implemented. Inclusion was limited to chapters in the standard practices condition to eliminate the possibility of a confound between experimental conditions for the parent study and the alcohol-free housing policy implementation of interest here. As shown in Figure 1, 21 of the 31 standard practice chapters met all of the inclusion criteria for the present analyses. (Of the 10 chapters that were excluded from the analysis, five had implemented alcohol-free housing prior to the baseline data collection, and five were exempted from the alcohol-free housing policy after it was implemented.) Fifteen of these 21 chapters had fraternity housing available to its members.

Data Collection

Project staff traveled to the 98 participating fraternity chapters to collect data by means of audio-enhanced computer-assisted self interviewing (A-CASI). Participants completed self-administered interviews in private and on touch-screen laptop computers. Other studies have found that the use of A-CASI enhances the validity of self-reported behavior regarding sensitive topics (e.g., Perlis, Des Jarlais, Friedman, Arasteh, & Turner, 2004). We also expected that in-person data

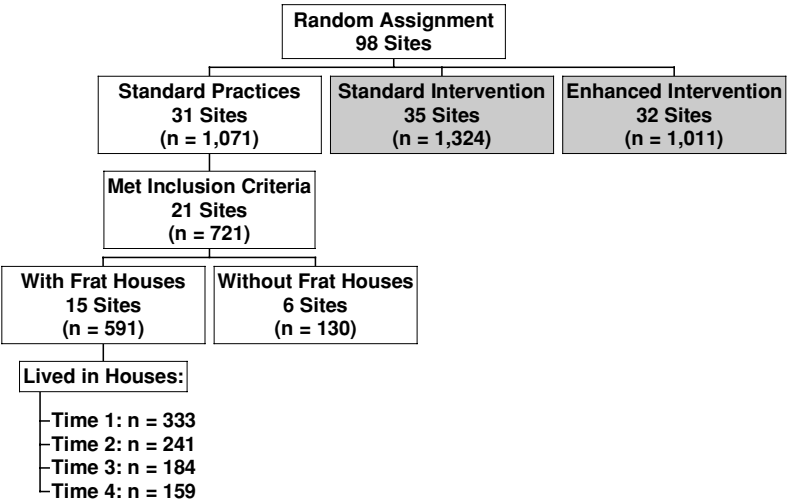


Fig. 1. Analysis sample for the study on alcohol-free fraternity housing.

collection, along with the use of A-CASI, would help to increase our overall response rates, which are often a problem in longitudinal field studies. Interviews lasted approximately 40 to 60 min, depending on the round of data collection (with the baseline interviews taking more time). At the baseline data collection, 99% of eligible chapters (98 of 99 chapters) participated in the study, and 84 to 89% of eligible student members participated in each of the four rounds of data collection.

Measures

Data were collected on members': (a) demographic characteristics, (b) knowledge about and attitudes toward alcohol use, (c) alcohol and other drug use, (d) alcohol-related problem behavior, and (e) helping behavior. Sobell and Sobell's (1992, 1993) Timeline Followback Interviewing procedures were used to collect data on daily alcohol use (number of standard drinks consumed per day and the number of hours over which they were consumed) over the past 28 days. Data captured with the Timeline Followback were used to compute multiple measures of alcohol use, including measures of frequency and amount of use, and of estimated blood alcohol concentration levels (BACs) achieved when drinking. (Rather than asking members to estimate their own BACs, we derived estimates of BACs achieved when drinking based on: data from the Timeline Followback on the number of drinks per day and the length of time over which those drinks were consumed, and members' self-reported weight. For more information on this measure, see National Highway Traffic Safety Administration, 1994.) In addition, we included a slightly modified, 21-item version of the Rutgers Alcohol Problem Index (RAPI). The RAPI, which was developed as a screening tool to assess problem drinking among adolescents (White & Labouvie, 1989), asked respondents to report on consequences from drinking over the past 30 days. Scores on each item ranged from 0 days to 5 or more days; total RAPI scores represent the mean across items for each participant. The internal consistency reliability estimates for the RAPI, as measured by coefficient alpha, was 0.88.

Analysis

The analysis used multi-level or mixed-effects regression models to examine potential changes in alcohol outcomes (alcohol use and RAPI) over time, while taking into account non-independence due to individual-level repeated measures over time (Raudenbush & Bryk, 2002; Snijders & Bosker, 1999). We used SAS PROC MIXED to fit models that examined the temporal effects across alcohol outcomes. Random intercept models were used to account for the repeated measures in the data. These models estimated an intercept for each individual, which allows for individual differences in alcohol outcome estimates across time. The

random-intercept models estimated here assumed normally distributed random effects.

The mixed-effects regression estimation used in this study is a full-information, maximum likelihood procedure in which missing data are assumed to be “ignorable,” conditional on both the model covariates and the observed responses (Raudenbush & Bryk, 2002; Snijders & Bosker, 1999). For inclusion in the analysis for a specific time point, a given participant’s data (i.e., including both the alcohol outcome variables and all model covariates) must be complete. Complete data for a participant can be used in the analysis, regardless of whether he has incomplete data for any of the other three time points.

To answer the research questions, we conducted two sets of analyses. Each set compared groups that should be differentially affected, if the alcohol-free housing policy was effective in reducing risky levels of alcohol use. One set of analyses compared members in chapters with fraternity housing (FH) and members in chapters without fraternity housing (NFH); if the alcohol-free housing policy was effective, we would expect to see a reduction in the level of alcohol use among FH members, but not NFH members. Another set of analyses focused on only those chapters with fraternity housing, and compared members who lived in fraternity housing (F-FH) with members of the same chapter who lived in non-fraternity housing (N-FH); if the alcohol-free housing policy was effective, in this case, we would expect to see a reduction in the level of alcohol use among F-FH members (because they lived in fraternity housing), but not N-FH members. Seven separate models were estimated for each set of analyses, one for each of six different alcohol use measures and one for the RAPI. The six alcohol use measures, which covered a 28-day period, included: (a) number of drinking days, (b) number of days consumed 5 or more drinks, (c) number of days consumed 8 or more drinks, (d) total number of drinks, (e) mean number of drinks on drinking days, and (e) mean estimated BAC on drinking days. The analysis also included two covariates, fraternity housing status (whether members resided in fraternity housing at the time of data collection) and year in school at baseline.

Study 2

Study 2 was based on additional data collected on members in the FH chapters that were included in Study 1. We collected these data after data collection for Study 1 had ended, largely to avoid influencing responses on the outcome variables.

Participants

Study 2 included 12 of the 15 FH chapters included in Study 1. Three chapters were excluded because they participated in only the first two rounds

of data collection and, hence, had less recent exposure to the policy. A random sample of three members was selected from each of the 12 chapters included.

Data Collection

Trained interviewers attempted to complete telephone interviews with members in the 12 included chapters, in spring 2003. Interviews lasted approximately 30 min. Twenty members (of the 36 sampled members) were interviewed in 10 of the 12 chapters. Of the 2 chapters that were not represented in Study 2, at the time of the follow-up data collection, one chapter no longer had any members who were enrolled in school (i.e., all members were ineligible), and one had members who were nonlocatable or ineligible. Of the 16 nonrespondents, 11 were ineligible and 5 were nonlocatable. Hence, the individual-level response rate was 80.0%.

Measures

The follow-up instrument included 28 closed-response items on awareness of the alcohol-free fraternity housing policy, enforcement of the policy, and perceived changes in alcohol use after implementation of the policy began. The time reference for each of the items was the period since implementation of the alcohol-free fraternity housing policy. The items on awareness of the policy asked respondents to rate how aware the members of their chapter were of the policy and to rate the popularity of the policy among those members. The items on enforcement asked respondents to: (a) indicate whether each of several alcohol-related activities was permitted or prohibited in chapter housing; (b) specify the persons responsible for enforcing the policy and what they did to monitor compliance; (c) describe the consequences of violating the policy; (d) indicate the frequency of members violating the policy; and (e) rate the extent of enforcement of the policy. The items on perceived changes in alcohol use asked respondents to report on any changes in the frequency of alcohol use in different settings (e.g., in chapter housing and on campus, but outside of chapter housing) following implementation of the alcohol-free policy.

Analysis

Given the small sample size for Study 2, we conducted simple descriptive analyses only on the results. First, because 8 of the 10 chapters in the follow-up study had multiple respondents (up to 3 respondents per chapter), we created a measure of within-chapter agreement. (This measure was computed as the percentage of pairs of respondents within a chapter—one pair for chapters with two respondents and three pairs for chapters with three respondents—that provided the

same response for a given item.) Unless otherwise mentioned, we report only on the items with mean within-chapter agreement exceeding 70%.

RESULTS

Study 1

For Study 1, descriptive statistics on covariates at baseline and on alcohol outcomes at each of the four data collection points are presented in Table I. Results clearly indicate that study participants engaged in high levels of alcohol use throughout the study period. We note that these alcohol use levels, regardless of whether members were in chapters with housing, exceed those described in some earlier reports on fraternity member alcohol use (e.g., Cashin et al., 1998; Marlatt et al., 1995), which may be attributable to the A-CASI data collection procedures and the high response rates achieved.

In addition, compared to NFH members, FH members reported significantly higher alcohol use at baseline on all of the use measures examined (as indicated by the significant estimates for fraternity house in Table II). For example, over a 28-day reference period, FH members reported consuming 5 or more drinks on 1.4 more days and approximately 1.5 more drinks per drinking day than NFH members; FH members had a mean estimated BAC that was 0.02 higher. In addition, RAPI scores at baseline were higher for FH members than for NFH members.

We also found that, among FH members, those who lived in fraternity housing (F-FH) reported significantly higher alcohol use at baseline than N-FH members on four of the use measures examined (as indicated by the significant estimates for living in house at baseline in Table III). For example, compared to N-FH members, F-FH members reported approximately 0.9 more drinking days, and consuming 8 or more drinks on 0.9 more days and 10.2 more drinks, over a 28-day period. These findings are consistent with those reported by Wechsler et al. (1996), who found that 86% of fraternity members who lived in fraternity housing engaged in “binge drinking” (i.e., consumed 5 or more drinks in a row over a two week period), compared with 71% of members in non-fraternity housing.

Does implementation of an alcohol-free fraternity housing policy reduce alcohol use among members in chapters with fraternity housing? To address the question of whether alcohol use declined following implementation of the alcohol-free housing policy, we estimated a series of 2-level mixed effects regression models that included three dummy coded time effects to represent the 6-, 12-, and 18-month follow-ups compared to baseline. The models also included a variable representing individuals’ year in school at baseline, a dummy variable indicating whether the chapter had a fraternity house, and covariate \times time interaction terms.

Because the four timepoints were represented by three dummy coded time variables, the intercept estimates reflect the average drinking levels for NFH

Table I. Descriptive Statistics for All Variables

Variable	Chapters with fraternity house				Chapters without fraternity house			
	<i>n</i>	<i>M</i>	<i>SD</i>	Range	<i>n</i>	<i>M</i>	<i>SD</i>	Range
Age at baseline	589	20.22	1.54	17–30	130	20.73	2.18	18–28
Year in school at baseline	588	2.70	1.17	1–5	130	2.68	1.22	1–5
T1 number of drinking days (last 28 days)	590	11.29	5.35	0–28	130	9.95	7.27	0–28
T2 number of drinking days (last 28 days)	410	11.30	6.21	0–27	93	9.47	7.34	0–28
T3 number of drinking days (last 28 days)	276	11.06	6.24	0–28	85	8.28	6.33	0–28
T4 number of drinking days (last 28 days)	227	11.26	6.65	0–28	81	9.25	8.32	0–28
T1 number of days drank 5 or more drinks (last 28 days)	590	8.53	5.05	0–23	130	7.09	6.86	0–28
T2 number of days drank 5 or more drinks (last 28 days)	410	8.65	5.83	0–27	93	6.91	6.98	0–28
T3 number of days drank 5 or more drinks (last 28 days)	276	8.84	5.93	0–28	85	5.68	5.60	0–28
T4 number of days drank 5 or more drinks (last 28 days)	227	8.56	5.94	0–28	81	6.31	6.78	0–25
T1 number of days drank 8 or more drinks (last 28 days)	590	5.95	4.75	0–23	130	4.91	5.55	0–20
T2 number of days drank 8 or more drinks (last 28 days)	410	5.97	5.37	0–26	93	4.70	5.35	0–19
T3 number of days drank 8 or more drinks (last 28 days)	276	6.21	5.39	0–25	85	3.72	4.76	0–24
T4 number of days drank 8 or more drinks (last 28 days)	227	5.82	5.57	0–24	81	3.74	5.15	0–22

Table I. Continued

Variable	Chapters with fraternity house				Chapters without fraternity house			
	<i>n</i>	<i>M</i>	<i>SD</i>	Range	<i>n</i>	<i>M</i>	<i>SD</i>	Range
T1 total number of drinks (last 28 days)	572	88.59	58.25	0–305	124	72.49	73.41	0–275
T2 total number of drinks (last 28 days)	392	86.76	61.63	0–350	89	68.70	72.70	0–313
T3 total number of drinks (last 28 days)	267	90.95	66.84	0–341	84	57.92	56.11	0–231
T4 total number of drinks (last 28 days)	223	86.11	64.37	0–300	78	58.42	64.39	0–250
T1 average number of drinks (last 28 days)	571	7.44	3.29	0–20.63	124	5.85	3.85	0–15.46
T2 average number of drinks (last 28 days)	393	7.51	3.53	0–21.42	89	5.99	3.58	0–13.76
T3 average number of drinks (last 28 days)	267	7.68	3.55	0–19.13	83	5.85	4.42	0–25.88
T4 average number of drinks (last 28 days)	224	7.23	3.72	0–24.00	78	4.76	3.40	0–13.31
T1 average BAC (last 28 days)	569	0.10	0.06	0–0.36	124	0.09	0.07	0–0.25
T2 average BAC (last 28 days)	393	0.10	0.06	0–0.40	89	0.08	0.06	0–0.24
T3 average BAC (last 28 days)	267	0.10	0.07	0–0.34	83	0.08	0.07	0–0.33
T4 average BAC (last 28 days)	224	0.09	0.06	0–0.34	78	0.06	0.06	0–0.23
T1 Rutgers Alcohol Problem Index (RAPI)	589	0.99	0.81	0–3.95	30	0.79	0.89	0–3.95
T2 Rutgers Alcohol Problem Index (RAPI)	411	1.06	1.01	0–5.00	93	0.74	0.96	0–5.00
T3 Rutgers Alcohol Problem Index (RAPI)	276	0.89	0.90	0–4.62	86	0.65	0.83	0–4.24
T4 Rutgers Alcohol Problem Index (RAPI)	226	0.89	0.96	0–4.90	81	0.66	0.90	0–3.90

Table II. Mixed Effects Regression Models Examining Alcohol Use Over Time in Chapters with and without Fraternity Houses

Fixed effects	Drinking days		Days 5 + drinks		Days 8 + drinks		Number drinks		Ave. drinks		Ave. BAC	
	Estimate	SE	Estimate	SE	Estimate	SE	Estimate	SE	Estimate	SE	Estimate	SE
	Estimate	SE	Estimate	SE	Estimate	SE	Estimate	SE	Estimate	SE	Estimate	SE
Intercept	9.16**	0.73	6.85**	0.67	4.80**	0.60	70.92**	7.45	5.99**	0.43	0.101**	0.008
Time 2 (6-month vs. baseline)	-0.66	0.83	0.10	0.73	-0.29	0.64	-2.53	7.88	0.81	0.50	-0.002	0.009
Time 3 (12-month vs. baseline)	-0.78	1.06	-0.84	0.93	-0.16	0.82	-7.50	10.16	0.01	0.64	-0.013	0.012
Time 4 (18-month vs. baseline)	-0.45	1.21	-1.28	1.06	-1.03	0.94	-13.58	11.53	-0.53	0.72	-0.021	0.013
Year in school at baseline	0.29	0.18	0.09	0.17	0.04	0.15	1.62	1.84	-0.02	0.11	-0.005*	0.002
Year in school × time 2	0.08	0.22	-0.10	0.20	0.02	0.17	-0.99	2.12	-0.26*	0.13	-0.001	0.002
Year in school × time 3	-0.37	0.29	-0.28	0.25	-0.40	0.22	-3.78	2.74	-0.03	0.17	0.002	0.003
Year in school × time 4	-0.21	0.32	-0.01	0.28	-0.13	0.24	-2.19	3.01	-0.21	0.19	-0.001	0.003
Fraternity house (0 = no, 1 = yes)	1.32*	0.60	1.43**	0.56	1.05*	0.50	13.92*	6.20	1.54**	0.35	0.018**	0.006
Fraternity house × time 2	0.30	0.63	0.14	0.55	0.08	0.49	2.51	6.05	0.02	0.38	0.003	0.007
Fraternity house × time 3	1.60*	0.67	1.93**	0.59	1.39**	0.52	19.48**	6.42	0.25	0.41	0.008	0.007
Fraternity house × time 4	0.58	0.69	0.81	0.61	0.76	0.54	12.37	6.63	0.77	0.42	0.009	0.008
Random effects	Estimated variance	SE	Estimated variance	SE	Estimated variance	SE	Estimated variance	SE	Estimated variance	SE	Estimated variance	SE
Individual variation	22.10	1.55	20.24	1.36	16.56	1.10	2554.18	173.10	6.76	0.50	0.002	0.001
Residual	16.44	0.68	12.68	0.52	9.76	0.40	1426.91	60.62	5.79	0.24	0.002	0.001
Null Model Likelihood Ratio Test (df = 1)	589.44**		703.43**		735.81**		682.28**		463.28**		413.80**	

* $p < 0.05$; ** $p < 0.01$.

Table III. Mixed Effects Regression Models Examining Alcohol Use over Time in Chapters with Fraternity Houses

Fixed effects	Drinking days		Days 5 + drinks		Days 8 + drinks		Number drinks		Ave. drinks		Ave. BAC	
	Estimate	SE	Estimate	SE	Estimate	SE	Estimate	SE	Estimate	SE	Estimate	SE
Intercept	11.09**	0.60	9.00**	0.55	6.36**	0.51	91.55**	6.21	7.71**	0.36	0.122**	0.006
Time 2 (6-month vs. baseline)	-0.75	0.73	-0.03	0.64	-0.32	0.58	-2.58	7.09	0.59	0.44	-0.001	0.008
Time 3 (12-month vs. baseline)	-0.75	1.12	-0.02	0.98	0.14	0.89	-1.22	10.94	-0.20	0.68	-0.012	0.012
Time 4 (18-month vs. baseline)	-0.18	1.25	-0.38	1.09	-0.06	0.99	-3.25	12.15	0.72	0.75	-0.007	0.014
Year in school at baseline	-0.07	0.20	-0.30	0.18	-0.28	0.17	-2.42	2.06	-0.15	0.12	-0.007**	0.002
Year in school × time 2	0.35	0.24	0.12	0.21	0.16	0.17	1.68	2.29	-0.19	0.14	-0.001	0.003
Year in school × time 3	0.12	0.32	0.14	0.28	0.02	0.26	0.31	3.13	0.17	0.20	0.005	0.004
Year in school × time 4	0.14	0.35	0.17	0.31	0.02	0.28	0.38	3.42	-0.26	0.21	-0.001	0.004
Living in house at baseline	0.94*	0.41	0.84*	0.37	0.90**	0.33	10.22*	4.10	0.39	0.25	0.006	0.004
Living in house at T2 × time 2	-0.76	0.54	-0.72	0.47	-0.61	0.43	-9.87	5.30	0.11	0.33	0.002	0.006
Living in house at T3 × time 3	0.46	0.67	-0.02	0.59	-0.06	0.53	6.04	6.59	-0.22	0.41	-0.003	0.008
Living in house at T4 × time 4	-1.24	0.71	-0.73	0.63	-0.90	0.57	-6.39	7.00	-0.46	0.43	-0.004	0.008
Random effects	Estimated variance	SE	Estimated variance	SE	Estimated variance	SE	Estimated variance	SE	Estimated variance	SE	Estimated variance	SE
Individual variation	20.01	1.56	18.96	1.40	16.71	1.35	2439.71	181.38	6.58	0.54	0.002	0.001
Residual	14.76	0.69	11.18	0.52	9.10	0.46	1329.19	63.82	5.35	0.26	0.002	0.001
Null Model Likelihood Ratio Test (df = 1)	456.74**		578.92**		620.62**		552.02**		385.09**		333.51**	

*p < 0.05; **p < 0.01.

members at baseline (i.e., when all time effects and chapter housing variables are 0), and the estimates for each time dummy variable represent the difference between the intercept and that timepoint. Because of the inclusion of the interaction terms, the covariate effects represent differences at baseline, and the covariate \times time interaction terms reflect comparisons between the follow-up timepoints and baseline for each variable. As a hypothetical example, a significant negative fraternity housing \times time 2 estimate would indicate that, at 6 months after baseline, FH members had steeper declines in drinking compared to NFH members, controlling for year in school. These models were estimated with data from 718 participants or level-2 observations, and a range of 1,822 to 1,885 repeated measures or level-1 observations. (The level-1 observations varied across the models because the dependent variables had different missing data patterns.)

Across all six models of alcohol use measures, we found no evidence of declines in use over time for FH members compared to NFH members, following implementation of the alcohol-free policy (see Table II). That is, we found no statistically significant negatively signed differences between FH members and NFH members on alcohol use changes over time. However, the chapter fraternity house covariate was statistically significant at baseline for all of the alcohol use variables, indicating that drinking levels were higher among FH members than among NFH members. In addition, we found some evidence of slight increases in alcohol use at 12 months compared to baseline, but only for FH members; this trend was absent at the 18-month follow-up. The mixed effects regression model of RAPI scores revealed no significant changes over time.

Among chapters with fraternity housing, does implementation of an alcohol-free fraternity housing policy reduce alcohol use among members who live in that housing? To address the question of whether alcohol use levels declined following implementation of the alcohol-free housing policy as a function of living in fraternity housing, we estimated a second series of 2-level mixed effects regression models with data from only FH members. Within the 15 chapters with fraternity houses, 333 participants reported that they lived in fraternity housing at baseline. During each follow-up interview, participants were asked again whether they resided in fraternity housing. We coded a binary time-varying variable indicating whether participants were residing in fraternity housing at each timepoint. Once again, the models used three dummy coded time effects to represent the 6-, 12-, and 18-month follow-ups compared to baseline. The models included a variable representing individuals' year in school at baseline, a time varying dummy variable indicating whether an individual resided in fraternity housing at each timepoint, and covariate \times time interaction terms. The model estimates are based on 588 participants or level-2 observations, and a range of 1,444 to 1,494 repeated measures or level-1 observations.

Across all six models of alcohol use measures, we found no evidence of declines in use over time for F-FH members compared to N-FH members, following

implementation of the alcohol-free policy (see Table III). While living in fraternity housing at baseline was associated with higher average levels of drinking on four measures (number of drinking days, number of days consumed 5 or more drinks, number of days consumed 8 or more drinks, and total number of drinks), we detected no differences in drinking levels following implementation of the alcohol-free policy as a function of living in fraternity housing or non-fraternity housing.

The mixed effects regression model of RAPI scores over time revealed some significant results, but they were not clear-cut. Fixed effects coefficients from the model were as follows: **Intercept** = 1.12, *SE* = 0.09; **Time 2** = 0.27, *SE* = 0.11; **Time 3** = -0.17, *SE* = 0.17; **Time 4** = -0.46, *SE* = 0.19; **Year in school** = -0.07, *SE* = 0.03; **Year in school** × **time2** = -0.05, *SE* = 0.04; **Year in school** × **time 3** = 0.04, *SE* = 0.05; **Year in school** × **time 4** = 0.12, *SE* = 0.05; **Fraternity house** = 0.12, *SE* = 0.06; **Fraternity house** × **time 2** = -0.11, *SE* = 0.08; **Fraternity house** × **time 3** = -0.03, *SE* = 0.10; **Fraternity house** × **time 4** = -0.10, *SE* = 0.11; Null Model Likelihood Ratio Text (*df* = 1) = 439.05, *p* < .0001. Coefficients that were statistically significantly different from zero (*p* < .05) are indicated by bold typeface.

These model coefficients indicate that participants who lived in a fraternity house at baseline reported significantly more adverse consequences of alcohol consumption compared to participants who did not live in a fraternity house at baseline. RAPI scores worsened slightly at time 2 after the policy was implemented; curiously, this result was not dependent on fraternity house residence where the policy would have been in force. Later, at time 4, RAPI scores decreased slightly relative to baseline, indicating small reductions in adverse consequences from alcohol consumption. Again, this result was not moderated by fraternity house residence status.

Study 2

Results from Study 2 suggest that awareness and enforcement of the alcohol-free housing policy were moderate. Ninety percent of respondents in FH chapters correctly reported that the policy prohibited kegs in fraternity housing; 45% correctly reported that the policy prohibited drinking any beer or wine in fraternity housing. Forty-seven percent indicated that violations of the policy were reported to fraternity officers. Some 75% indicated that their houses never had kegs following implementation of the policy; another 15% reported that they rarely had kegs after implementation. On an 11-point index that ranged from no implementation (0) to very great extent of implementation of the policy (10), 50% indicated that extent of enforcement was 7 or higher; the mean was 5.0 (*SD* = 3.4).

Mean within-chapter agreement dropped below 70% for variables that measured perceived changes in alcohol use (to between 54% and 58%). Nonetheless, the findings are noteworthy, suggesting that alcohol use by members in fraternity housing may have shifted to other locations, following implementation of the alcohol-free policy. First, 55% of the members in FH chapters indicated that the frequency of drinking in fraternity housing decreased, 45% reported that it remained the same, and no members reported that the frequency of drinking in fraternity housing increased. Second, this 55% of members that reported a decrease in the frequency of drinking in fraternity housing was much larger than the percentage of students that reported decreases for other on- and off-campus locations (15% and 11%, respectively). Third, a larger percentage of members perceived that the frequency of drinking increased in other on- and off-campus locations (25% and 26%, respectively) than in fraternity housing (0%).

DISCUSSION

In Study 1, we found no evidence to indicate that implementation of an alcohol-free housing policy reduced the high levels of student alcohol use, especially among FH members, observed at baseline. With regard to our first research question, we found that, for all members, regardless of whether their chapter had a fraternity house, alcohol use remained at high levels following implementation of the policy (i.e., no decline in slopes over time). With regard to our second research question, we found that, in chapters with fraternity houses, alcohol use levels did not vary over time as a function of residing in fraternity housing. In other words, members living in and out of fraternity housing had equivalently high levels of alcohol use at baseline and after the policy was implemented. The decline at time 4 on RAPI scores for FH members is not consistent with policy-related effects, because: (a) the decline occurred over a year after the policy was first implemented; (b) the decline occurred for both N-FH and F-FH members; and (c) we observed no policy-related changes in the alcohol use measures.

Two interpretations of these null results are worth considering, one that focuses on implementation failure and one on theory failure. The former interpretation is implementation of the alcohol-free housing policy may have been so weak or inconsistent as to preclude a legitimate assessment of its effectiveness. For example, if enforcement of the policy (which was very unpopular among fraternity members) was deemed the responsibility of chapter officers and members, implementation may have failed because members were either unaware of the policy, or they ignored it. The results of Study 2 suggest that awareness and enforcement of the policy were moderate overall. Hence, these findings do not support the implementation failure interpretation.

The theory failure interpretation is, even if implementation was adequate, the alcohol-free housing policy may have been unable to achieve its objectives, perhaps because it was based on faulty causal assumptions. For example, such a policy may have shifted alcohol use from fraternity housing to other settings without changing levels of alcohol use. The Study 2 results on perceived changes in alcohol use suggest that some shifting did occur. (We note that, to the extent that a change in venue for alcohol use involved driving, the policy had the potential for heightening the risk for driving while intoxicated and for riding with an intoxicated driver.) Hence, these results support the theory failure interpretation.

As a stand-alone policy to reduce excessive alcohol use among fraternity members, our investigation indicates that alcohol-free fraternity housing is ineffective over the short-term, possibly due to theory failure. If the theory failure interpretation is correct, reducing risky drinking practices may require thoughtfully combining broader restrictions on alcohol use—beyond the confines of fraternity housing—and the use of individually-focused prevention approaches (many of which have been shown to reduce risk among fraternity members) in ways that minimize conflicts between prohibitory messages and risk reduction messages. Effective policies designed to restrict the availability of alcohol may well have to take on both the proximal environments of members (e.g., fraternity housing) and their distal environments (other settings on campus and in the community). This is consistent with the NIAAA task force on college student drinking (NIAAA, 2002), which advises that these two types of environments, as well as individual-level factors, should be targeted in efforts to reduce excessive alcohol use among fraternity members.

The current research raises questions that should be addressed in future research. First, subsequent research should examine the extent to which restrictions in the distal environments of fraternity members moderate the effects of an alcohol-free policy on alcohol use. As mentioned, alcohol-free fraternity housing policies may work best when alternative settings for alcohol use are limited. Second, researchers also would be well-advised to examine the factors associated with stronger implementation of such a policy. While the current research found that the strength of implementation was moderate overall, it varied a fair amount by chapter. Understanding the chapter-level and campus-level factors associated with such variation would be very useful to university and fraternity administrators considering implementation of an alcohol-free policy. Third, researchers should consider the long-term effects of an alcohol-free housing policy. If it is implemented well and sustained, such a policy could conceivably lead to changes in the composition of fraternity members. For example, students who abstain from alcohol use or drink in moderation may be more likely to accept—and perhaps even seek—chapters that prohibit alcohol in fraternity housing. Those changes could contribute to meaningful reductions in the alcohol-related risk of fraternity members.

The current research has two main limitations. First, the Study 1 design limits our ability to make causal attributions to the alcohol-free fraternity housing policy. Because this study design was quasi-experimental rather than experimental (i.e., no random assignment of chapters or members to conditions), we are unable to control completely for pre-existing differences between members in FH and NFH chapters (and between F-FH and N-FH members) on the outcome measures. Second, Study 2, which we used mainly to explore interpretations of the Study 1 findings, had several limitations. Due to these limitations, including a small sample size and potential respondent recall problems, the results of Study 2 are more suggestive than conclusive.

ACKNOWLEDGMENTS

This study was supported by a grant from the National Institute on Alcohol Abuse and Alcoholism (RO1 AA012532). We gratefully acknowledge the contributions of colleagues Bernadette Campbell, Karin Davis, Joe Gertig, John Kennedy, Mary Kliesch, Joy Kosman, Bill Luckey, Sanjeev Sridharan, Anne Worthen, and Nicole Yoshida. Some of the findings from this paper were previously presented at the meeting of the American Evaluation Association in Arlington, VA (November 2002).

REFERENCES

- Borsari, B. E., & Carey, K. B. (1999). Understanding fraternity drinking: Five recurring themes in the literature, 1980–1998. *Journal of American College Health*, 48, 30–37.
- Cashin, J. R., Presley, C. A., & Meilman, P. W. (1998). Alcohol use in the Greek system: Follow the leader? *Journal of Studies on Alcohol*, 59, 63–70.
- Dowdall, G. W., & Wechsler, H. (2002). Studying college alcohol use: Widening the lens, sharpening the focus. *Journal of Studies on Alcohol*, 63(Suppl. 14), 14–22.
- Fraternity Executives Association (FEA) (2002). FEA Survey 2001–2002. Unpublished report.
- Hingson, R. W., Heeren, T., Zakocs, R. C., Kopstein, A., & Wechsler, H. (2002). Magnitude of alcohol-related mortality and morbidity among U.S. college students ages 18–24. *Journal of Studies on Alcohol*, 63(Suppl. 14), 136–144.
- Kapner, D. A. (2003). *Alcohol and other drugs on campus: The scope of the problem*. Retrieved August 8, 2003, from www.edc.org/ec/ubs/factsheets/cope.html.
- Kilmer, J. R., Larimer, M. E., Parks, G. A., Dimeff, L. A., & Marlatt, G. A. (1999). Liability management or risk management? Evaluation of a Greek system alcohol policy. *Psychology of Addictive Behaviors*, 13, 269–278.
- Larimer, M. E., Anderson, B. K., Baer, J. S., & Marlatt, G. A. (2000). An individual in context: Predictors of alcohol use and drinking problems among Greek and residence hall students. *Journal of Substance Abuse*, 11, 53–68.
- Larimer, M. E., & Cronce, J. M. (2002). Identification, prevention and treatment: A review of individual-focused strategies to reduce problematic alcohol consumption by college students. *Journal of Studies on Alcohol*, 63(Suppl. 14), 148–163.
- Marlatt, G. A., Baer, J. S., & Larimer, M. E. (1995). Preventing alcohol abuse in college students: A harm-reduction approach. In G. M. Boyd, J. Howard, & R. A. Zucker (Eds.), *Alcohol problems*

- among adolescents: *Current directions in prevention research* (pp. 147–172). Hillsdale, NJ: Erlbaum.
- Meilman, P. W., Leichter, J. S., & Presley, C. A. (1999). Greeks and athletes: Who drinks more? *Journal of American College Health*, 47, 187–190.
- National Highway Traffic Safety Administration (1994). *Computing a BAC estimate*. Washington, DC: U.S. Department of Transportation, National Highway Traffic Safety Administration.
- National Institute on Alcohol Abuse and Alcoholism Task Force of the National Advisory Council on Alcohol Abuse and Alcoholism (2002). *A call to action: Changing the culture of drinking at U.S. colleges* [NIH Publication No. 02–5010]. Bethesda, MD: National Institutes of Health.
- National Panhellenic Conference (2004a). *College Panhellenics: Programs*. Retrieved June 24, 2004, from http://www.npcwomen.org/college/c_programs.php.
- National Panhellenic Conference (2004b). *Policies: Resolutions and recommendations*. Retrieved May 6, 2004, from http://www.npcwomen.org/policies/p_resolutions.php.
- O'Malley, P. M., & Johnston, L. D. (2002). Epidemiology of alcohol and other drug use among American college students. *Journal of Studies on Alcohol*, 63(Suppl. 14), 23–39.
- Perlis, T. E., Des Jarlais, D. C., Friedman, S. R., Arasteh, K., & Turner, C. F. (2004). Audio-computerized self-interviewing versus face-to-face interviewing for research data collection at drug abuse treatment programs. *Addiction*, 99, 885–896.
- Presley, C. A., Meilman, P. W., & Cashin, J. R. (1996). *Alcohol and drugs on American college campuses: Use, consequences, and perceptions of the campus environment*, vol. IV: 1992–94. Carbondale, IL: Core Institute, Southern Illinois University.
- Raudenbush, S. W., & Bryk, A. S. (2002). *Hierarchical linear models: Applications and data analysis methods* (2nd edn.). Newbury Park, CA: Sage Publications.
- Sher, K. J., Bartholow, B. D., & Nanda, S. (2001). Short- and long-term effects of fraternity and sorority membership on heavy drinking: A social norms perspective. *Psychology of Addictive Behaviors*, 15, 42–51.
- Snijders, T. A. B., & Bosker, R. J. (1999). *Multilevel analysis*. Thousand Oaks, CA: Sage.
- Sobell, L. C., & Sobell, M. B. (1992). Timeline Followback: A technique for assessing self-reported ethanol consumption. In J. Allen & R. Z. Litten (Eds.), *Measuring alcohol consumption: Psychosocial and biological methods* (pp. 41–72). Totowa, NJ: Humana Press.
- Sobell, L. C., & Sobell, M. B. (1993). *Alcohol Timeline Followback users' manual*. Toronto: Addiction Research Foundation.
- Wechsler, H., Kuh, G., & Davenport, A. E. (1996). Fraternities, sororities and binge drinking: Results from a national study of American colleges. *NASPA Journal*, 33, 260–279.
- Wechsler, H., Lee, J. E., Gledhill-Hoyt, J., & Nelson, T. F. (2001). Alcohol use and problems at colleges banning alcohol: Results of a national survey. *Journal of Studies on Alcohol*, 62, 133–141.
- Wechsler, H., Lee, J. E., Kuo, M., & Lee, H. (2000). College binge drinking in the 1990's: A continuing problem. *Journal of American College Health*, 48, 199–210.
- Wechsler, H., Lee, J. E., Kuo, M., Seibring, M., Nelson, T. F., & Lee, H. (2002). Trends in college binge drinking during a period of increased prevention efforts: Findings from 4 Harvard School of Public Health College Alcohol Study Surveys: 1993–2001. *Journal of American College Health*, 50, 203–217.
- Wechsler, H., Seibring, M., Lui, I., & Ahl, M. (2004). Colleges respond to student binge drinking: Reducing student demand or limiting access. *Journal of American College Health*, 52, 159–168.
- White, H. R., & Labouvie, E. W. (1989). Towards the assessment of adolescent problem drinking. *Journal of Studies on Alcohol*, 50, 30–37.